11 Victoria Street S.W.
London April 20/59

My dear Gray

Did not you once say that the Lowell Institute (I believe) sometimes buys plants when any particularly good collections are for sale? M^r Spruce wrote to me last winter that he wished his own reserved set of North Brazil & Venezuela plants to be disposed of. I offered it to a Belgian gentleman who (as de Candolle informed me) was going to set up as a patron & collector à la Delessert at Brussels - He has however never answered me so I must look out elsewhere for a purchaser. The set will consist of at least 3000 species at £2.10.0 the hundred - I charge more 1^st because it contains sometimes more than one specimen of a species, 2^d because it includes

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several not generally distributed
or that only exist besides in the
complete collection at Kew and I
because I am having it all gone
over to relabel and correct the
names according to all recent
determinations in various works.
— It does not however contain the
first 290 species collected about
Para for it was not till after
these were distributed that
the Spruce denied his set to
be received — If you think it
likely that you will dispose of it
will you kindly write to me
so that I may receive your
letter before I go abroad (about
the 8th June) and I will send
further particulars as I shall
by that time have had it all
gone over and counted.

Did Wright send any notes of
stations with his Hong Kong plants?
There are some such as Cassia

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suffrutescens which are without
doubt planted in Hong Kong - not
wild -

I am getting on but slowly with
the Hong Kong flora - Species
plants take me up so much
time notwithstanding the
assistance I have engaged for
them.

Have you ever looked into
Planchon's outline arrangement
of Araliaceae in the Revue
Horticole two or three years
back? - His genera seem
easily recognisable so far as
the South American ones
are concerned - I do not know
whether the characters of
detail will bear scrutiny and
on the species are only named.
I know nothing of this new one.

De Candolle has just finished
Begonias and has returned

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the Hookerian specimens he has
borrowed — He keeps up the
genus nearly entire.

Yours ever sincerely

George Engelmann

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Asa Gray

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Rec June 10th

25, WILTON PLACE.
S.W.

May 28/79

My dear Sir

In going over again carefully your male specimen of Rhododendron piniperianum I have succeeded in finding some sufficiently advanced to show clearly ~~their~~ position and structure of the flowers and I am obliged to say peccavi as to what I have written before. There are clearly two stages of flowers (2 lower flowers and 1 or 2 upper ones) and the anthers just ready to open are quite those of Rhododendron and not Arcanthobium so that I readily concur with you in placing it in Rhododendron notwithstanding its Arcanthobium habit.

As to the fruit of Arcanthobium it

certainly is narrower than in most species of Rhododendron and decidedly stipitate but I must say that I can find no trace of transverse dehiscence but only a transverse line separating the dilated apex of the stipes from the broad base of the berry - Of the European Arcuthobium however notwithstanding our very numerous specimens from various localities we have not one with ripe fruits - Of the American ones we have several with apparently ripe fruits and perfect seed but none of them dehiscens

Yours very sincerely

George Bentham

A. Engelmann

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George Bentham

Augt 1879

My dear Dr Engelmann

I have now gone through the whole of the Coniferae and studied to the best of my ability your valuable letter of the 6th July as well as various published essays on this most interesting order, the morphology of which has been and is still the matter of so much controversy, and venture to submit to you the conclusions I have come to under the several heads of: 1 the male flowers, 2 their relations to the females, 3 the female inflorescence and flower, & 4 the systematic arrangement of the genera. On all these points I have no new discoveries to give, but my conclusions are the result of absolute conviction or great probability produced by the arguments of various writers in whom I have great confidence, as confirmed in most cases by observations of my own, as far as I have been able to extend them in the rich collections of the Kew herbarium Museum & Garden.

1 the male flower. What is often called the simple male amentum is a single male flower, without any perianth or rudimentary ovary and thus reduced to the stamens only, which are indefinite, often very numerous, the filaments united (as in Myristica several Euphorbiaceae etc.) in a central axis upon which the anthers are sessile or shortly stipitate, the stipes may be considered either as the base of the connective or as the free end of the filament, there being seldom if ever any distinct articulation.

The arrangement of the anthers round the axis is frequently, but not always the same as that of the leaves round the branches, and Parlatore adduces this similarity of arrangement, which he supposes to be constant, as one proof that the anthers are really bracts bearing two or more anthers. He gives, as a character of his subtribe Cupressea, "flowers ♂; bracteae decussatim oppositae v. ternatim verticillatae" but I cannot agree either with the premises he gives or with the conclusions he draws from them that is the case in Cupressus, Thuia, Libocedrus and to a certain degree in Juniperus but not in Callitris and its allies, where the spiral arrangement of the anthers is very distinct although the leaves are opposite and decussate or in whorls of 3 rarely 4. Moreover, in Angiospermous orders, the opposite decussate arrangement of the leaves is sometimes carried on in the floral envelops stamens and even to the ovary (e.g. some Ruttiferae and Rhamneae), whilst usually in opposite-leaved orders the floral envelops and stamens are in quinary or other whorls.

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The anther cells, 2 or more, are either adnate to the stipitiform base of the connective or suspended from the summit of the stipes or from the base of the squamiform appendage of the connective; the connective, always stipitiform at the base, is most frequently but not always, produced beyond the cells into a squamiform ovate or peltate appendage. These appendages being incurved and sometimes imbricate in the young flower give it that appearance which induced the confounding it with an amentum. The dehiscence of the anther cells is too well described to need comment.

Of the pollen I say nothing. There is no doubt that there are two kinds which have been designated as the Cupressineous and the Pinaceous pollen and that the former is prevalent in Cupressineae, the latter in Abietineae, but exceptions are reported, and until the pollen of all the genera and of the majority of species shall have been carefully examined and described, it will not be safe to make use of it in generic characters.

2 The relation of the male to the female flowers. In the majority of Dicotyledonous genera with uniserual flowers of reduced structure, there is considerable difference between the males and the females, not only in the absence or imperfection in each sex of the sexual organs of the other sex, but in the absence or degree of evolution of the floral envelops, and also in inflorescence; and so it is in Coniferae, but usually the differences in Coniferae do not exactly correspond to those prevalent in Angiosperms. In Euphorbiaceae Cupuliferae Urticaceae ~~for instance, Amentaceae~~ etc. for instance, the male inflorescence is often amentaceous racemose or paniculate, and the female flowers solitary or very few, whilst in Coniferae the males are usually solitary and the females amentaceous, but this is not always the case. In most genera the single male flower terminates a leafy branch or a bud or very reduced branchlet covered with imbricate scales, sometimes so short that the flower appears at first sight axillary and sessile. But in Juniperus sect Caryocedrus (Arceuthos Ant. et Kotsch.), in Cephalotaxus and in Cunninghamia, the male flowers are collected several together in a head or short amentum, each one in the axil of a scale or small bract, without any intervening imbricate scales or bracts, and the whole head, at least in Cephalotaxus and Cunninghamia, is surrounded by an involucre of imbricate scales and bracts, like the female amenta of many genera. In some species of Phyllocladus also the males are paniculate each

one in the axil of a single bract and even in the spicate inflorescence of Pinus, the imbricate scales at the base of each flower within the subtending scale are often wanting, reducing the spike to a close analogy with the female amentum. In Pinus, a bud terminating the axis after flowering is usually developed after the flowering into a leafy shoot, but that occasionally occurs also in the female amentum, especially when the flowers become accidentally aborted. The female inflorescence is certainly usually a spike (amentum) with a single flower sessile within each scale or bract, but in Taxus, Torreya and some others the single flower terminates an exceedingly short axillary shoot covered with imbricate scales or bracts, as is so frequently the case in the males.

Neither sex has any perianth properly so-called, and in the males nothing intervenes between the subtending bract scale or leaf and the staminal column, whilst in the female the ovule proceeds from an intervening organ variously interpreted to which I shall presently revert, but similar or more or less analogous differences between the two sexes may be observed in many Euphorbiaceæ or other Angiospermous orders.

3 The female inflorescence and flower. With regard to the disputed homologies I cannot but consider the gymnospermy as proved, notwithstanding the arguments of the organogenesists and ultra-evolutionists, and I coincide with Baillon Dickson and Van Tieghem in their views of the essential uniformity of structure of the female flower in all Coniferæ, to be seen especially at the time of flowering, notwithstanding the great and varied changes which take place immediately after fecundation. There are only two or three monotypic genera of which I have not had female flowers to examine and can only deduce their structure from that of the young or perfect fruit.

Throughout the order, each female flower is solitary within a scale like bract. In the majority of genera these flowering bracts are several or numerous, forming a dense spike or amentum, rarely a looser spike, and at the base of the amentum there are frequently several sometimes numerous empty bracts or scales, usually smaller, forming a kind of involucre. In Taxus Torreya and a few

others it is only the uppermost bract that is floriferous, the others are all empty and imbricate, usually gradually enlarged from the lowest to the floriferous one, which is generally scarcely different from the next below it. The arrangement of these bracts, flowering or not, round the axis of the spike or amentum is usually the same as that of the leaves round the branchlets, and sometimes the passage from the upper leaves to the empty bracts is gradual although generally the change is abrupt. In Chamaedorea however (so unaccountably referred by Martius to Dacrydium), whilst the leaves of the branchlets are so strikingly opposite and decussate, the scales of the amentum are remarkably spiral and multiseriate.

Each female flower consists of one two or more ovules, sessile on a more or less fleshy organ, in the axil of and usually more or less adnate to the bract. This organ has received the several names of ovuliferous leaf, scale, bract, pericarp, torus, disk or ovary, according to its supposed homology under the various theories proposed in explanation of the structure of the flower. None appears to me to be nothing as yet absolutely conclusive of its true homology, and I have therefore adopted for it the term ovuliferous lamina, which, being derived from its external appearance, begs no question as to its theoretical significance. This lamina is in most genera so closely combined with the bract, especially at the fruiting stage in which Coniferae are usually described, that there is a convenience in systematic descriptions in treating the two as a single organ, either apparently simple or evidently double according to the genus. This compound organ may be conveniently designated (as it usually is) by the name of scale, a term which, like that of ovuliferous lamina, is founded upon external appearance, not on theoretical origin.

As a general rule, at the time of flowering, the bract is the most conspicuous, the ovuliferous lamina is shorter and open, and the outer integument of the ovule is also open at the orifice, leaving a free passage for the pollen to the nucleus. Immediately after fecundation, the orifice of the outer integument closes over the nucleus, the ovuliferous lamina rapidly enlarges, often becoming very soon the principal part of the scale, and closes over the ovule or ovules either by close imbrication or by actually enclosing each ovule, opening only at maturity to let out the seed and sometimes not even then. But there are numerous irregularities or exceptions to the general rule which may be best considered under each of the principal tribes.

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4 Systematic arrangement of the genera. Of the various tribes into which Coniferæ have been divided I propose the adopting six, viz: three with erect ovules, Cupressineæ, Taxodieæ and Taxeæ and three with reversed ovules, Podocarpeæ, Araucarieæ and Abietineæ. I proceed to examine them successively. The male flowers often supply secondary characters confirmatory of the groups characterised by the females, and very rarely slightly clashing with them.

1. Cupressineæ. Leaves, at least those of the flowering branches and scales of the female amenta, opposite and decussate or in alternate whorls of 3 very rarely 4. Ovuliferous lamina and bract closely united into an apparently simple scale. At the time of flowering the bract is usually predominant, flat or even concave at the back, with a short terminal point, the ovuliferous lamina forming a thickened base usually much shorter than the bract. After fecundation the ovuliferous lamina is much and rapidly enlarged, finally forming nearly the whole scale, the bract only recognised by the tip forming an umbo or point on the back of the scale, and often by the slightly raised decurrent margins. This includes seven genera: 1. Callitris. Cone of 4, 6 or 8 fertile scales in two rows, but, when ripe, they open valvately, apparently in a single row, all equal or the outer ones slightly smaller scarcely overlapping the others. There are about 14 species ~~described~~ in 4 sections: α Octoclinis, an Australian species with the leaves and scales 4 in a whorl; b. Hexaclinis, 8 Australian and 1 New Caledonian species with whorls of 3; c. Tetraclinis ~~one~~ one N. African and Canary-island species, with the leaves and scales opposite and decussate; and d. Pachylepis (Carolinia Endl. afterwards changed to Widdringtonia), three S. African and Madagascar species, with the scales and leaves of the flowering branches opposite and decussate as in Tetraclinis, but thicker and more woody scales and the decussate arrangement of the leaves irregularly broken and almost spiral on the older branches. ~~The name~~ Ventenat's original species was an Australian Hexaclinis but it was by some blunder that it was supposed to be the African Tetraclinis. Frenela was never proposed by Mirbel as a genus distinct from Callitris, but merely a name which he substituted for that of Callitris which he considered as too near to Calythrix.

2. Actinostrobus, two S.W. Australian species, only differing from Callitris (Hexaclinis) in having two or three empty scales closely appressed to the back of each scale of the cone.

3 Fitzroya, One S. Chilean and one Tasmanian (Dacrydium) species with 2 or 3 fertile scales opening valvately in a single row and 1 or 2 outer rows of 2 or 3 empty scales each, but not always

4 Libocedrus. Eight species, with the characters nearly of Thuja (Euthuja) and often the same flattened leafy branches, but the seeds instead of being laterally winged or wingless are prolonged into a terminal wing so as to be samaroid. Six species, from Chile New Zealand New Caledonia and Japan differ moreover from Thuja in having no terminal empty scales to the cone, but in two species L. decurrens (Heydenia C. Koch) from California and L. macrolepis

(Calocedrus, S. Kurz), from Yunnan in China, these empty scales are present and the
wing of the seed alone separates them from Thuja. 5 Thuja. Scales of the cone
opposite and decussate, 2 to 6 (1 to 3 pair) fertile with 1 or 2 outer and 1 inner pair
empty, almost as in Cupressus but only 2 or 3 very rarely 4 or 5 ovules to each fertile scale, and the cone
usually much less thickened and hardened than in Cupressus to which the genus is perhaps
too closely allied. The 5 or 6 species are distinct enough to form 4 sections, a Euthuya, the
original N. American species with only two fertile scales to the cone and broadly winged
seed; b. Macrothuya, the N. American T. gigantea and a Japanese species with 2 or 3 pair
of fertile scales and narrow-winged seed; c. Thujopsis, a Japanese species differing from Macrothuya in having
often 4 or 5 ovules to the scale, and d. Biota, two species or varieties from China and
Japan, the old T. orientalis, with the habit of Euthuya but usually 2 pair of fertile
scales and no wings to the seed. 6. Cupressus, has usually the habit of some Junipers
with the characters almost of Thuja but the cones are usually more globular with
the scales much more thickened and hardened, and in the typical species, spread over the northern hemisphere, there are numerous
ovules within each scale, and the terminal empty scales are rare.
forming a genus proposed under the names of Chamaecyparis Chamaecyparis and Retinospora
the cones though globular and hard are small with only 2 to 4 ovules under each
fertile scale. These species nearly connect Thuja with Cupressus, ~~and if transferred to Thuja~~
~~Cupressus and Juniperus~~ and if transferred to Thuja might perhaps leave the
two genera more natural and better defined. 7. Juniperus. In the flowering stage there
is very little difference between Junipers and Thuja and Cupressus, but immediately
after fecundation the change is very great, the ovuliferous laminae enlarge and
thicken very rapidly, close completely over the ovules, and become consolidated into a
drupaceous syncarp, the inner strata hardening either into what may be termed
distinct pyrenes round each seed or into a woody mass with separate cells for
each seed whilst the outer strata form the succulent part of the drupe or meso-
carp, the remains of the bract reduced as in Cupressus or Thuja to small umbos
or points at the back of each scale. This drupaceous cone or syncarp has been
termed a galbulus in contradistinction to the strobilus of Cupressus, but the term
is of little use and essentially faulty for the galbulus of the Romans was the hard dry cone
of Cupressus, and the general term strobilus appear to be all that is needed for
designating the compound fruit of all the genera of Cupressineae as well as of Abietineae.
The J. drupacea, Labill., forming the section Caryocedrus, Endl. or the genus Arceuthos Ant. et Kotsch. is remarkable
II. Taxodieae. The two typical genera of this tribe, Cryptomeria and Taxodium,
only differ from Cupressineae in the arrangement of the leaves and of the scales of the
female amentum, which are not verticillate, but spirally inserted all round the branch
or axis, although the leaves (except on young shoots) are often spread out distichously

as is frequently the case in other genera where they are spirally affixed. Cryptomeria has a single Japanese and Chinese species remarkable for the lobed margin of the ovuliferous lamina giving a muricate appearance to the cone. Taxodium, with 2 American and one Chinese species is the only Conifer besides Larix that loses its leaves in winter. ~~Athrotaxis~~ the ~~associated~~ Chinese one has been distinguished as a genus under the name of Glyptostrobus but the character derived from the form of the seed-coats wing, does not appear to be of generic importance. Under the same tribe might be included the somewhat anomalous genus Cephalotaxus, 3 Japanese, and 1 Chinese ~~and so~~ species, and possibly one from N. E. India, in which the female flower is much the same as that of Taxodium, but the scales consisting of the consolidated ovuliferous lamina and bract, do not change after fecundation, the ovules alone enlarge, the seed is consequently exserted from the spike though still sessile and the testa becomes thick and drupaceous fleshy outside hard inside.

III. Taxeæ Arrangement of the leaves and floral bracts as in Taxodieæ. Ovuliferous lamina in the axil of the bract but free from it (or attached to its very base?) at first perfectly or imperfectly annular, soon enlarging into a cup and sometimes at length completely enclosing the seed either free from it or adnate to it. To this tribe may be referred five or six genera, ~~1 Taxus~~ three northern ones with uniflorous female amenta, the imbricate bracts all empty except the uppermost, and three southern ones with the amenta usually but not always several-flowered. 1. Taxus Several species considered by many botanists as varieties of a single one spread over the northern hemisphere both in the new and the old world. Amentum 1-flowered. Ovuliferous lamina scarcely prominent at the time of flowering, assuming very early the cup shape and finally enclosing the seed though free from it except at the base. 2. Torreya three or four species from North America Japan and China. Amentum 1-flowered. Ovuliferous lamina passing into the cup shape and finally enclosing the seed but adnate to it throughout. Albuinea remarkably ~~muricate~~ a character not observed in any other Conifer. 3 Ginkgo or Salisburea. Amentum (always?) 1-flowered. Ovuliferous lamina contracted at the base into a long stipes expanded at the top into 2 or sometimes more short branches each dilated under the ovule into an annular disk soon becoming a short cup adnate to the base of the seed. This remarkable ovuliferous lamina had been generally described as a pedicle bearing two or more flowers, but its true nature has been well explained by Von Kopken whose observations are fully confirmed by the examination of the few imperfect female flowering specimens we possess. 4. Dacrydium. About ten species chiefly from Tasmania New Zealand and New Caledonia but extending also to the Fiji islands & the Malayan Archipelago and one Chilian species published by Philippi under the name of Lepidothamnus. Amentum 1- to 6-flowered. Ovuliferous lamina at first dish-shaped or concave, at length somewhat obliquely cup-shaped and open or incomplete on the inner side, its obliquity often throwing

the ovule and seed a little on one side, but I have never seen them reversed.
D. taxoides and D. Pancheri of Arnheim and Sci appear to me to belong both in habit and character to Podocarpus. 5. Phyllocladus, three Tasmanian and New Zealand species, chiefly characterised by the curious phyllodineous branchlets. Amenta several-flowered, ~~very near~~ the ovuliferous lamina very nearly that of Dacrydium Sprengel's name Thalamia has the right of priority but it was published in a book very little known and Richard's Phyllocladus has been so universally adopted, that it would now only produce confusion without any advantage to restore Sprengel's name. 6 Heterosphera, a single Tasmanian species which appears to be referable to this ~~species~~ tribe, but I have not been able satisfactorily to trace the development of the female flower. There are some errors in Hooker's description owing to the specimens having been mixed up with those of Microcachrys. The single ovule is erect in the axil of the scale but I have not been able to satisfy myself whether the ovuliferous lamina is connate with the bract or as is more probable ~~with~~ forming the thin membranous outer covering of the seed.

IV. Podocarpeæ. Ovulum 1, reversed, attached to the apex of the ~~adnate~~ ovuliferous lamina whether adnate to the scale or exserted and contracted into a stipes. The tribe comprises three genera 1. Microcachrys. Amentum several-flowered, globular, the ovule (one Tasmanian species) attached near the apex of the fleshy scale (apparently composed of the combined ovuliferous lamina and bract) but the development not satisfactorily ascertained owing to the want of good specimens in the flowering state. The genus is curious in many respects amongst others for the strictly decurrate leaves of the flowering branches whilst the scales of the amentum are spiral and pluriserrate. It has no connection with Dacrydium to which it is referred in the Prodromus. 2. Saxegothea, a single Chilian species, very near Microcachrys as to the female flower but with a very different foliage, the long dense cylindrical staminal column of Podocarpus and the cone apparently an indehiscent nucamentum. 3. Podocarpus, a genus of perhaps 40 species, very different in foliage, chiefly from extratropical regions of the southern hemisphere but some also from tropical America and tropical and southern Asia. Amenta 1- or rarely 2-flowered, the lower empty bracts few and sometimes combined with the rachis or pedicels in a fleshy or succulent mass. Ovuliferous lamina contracted into a stipes and projecting from the bract, dilated at the top and partially or almost totally enclosing the ovule as a cup and adnate to it, this reflexed ovule is usually so entirely adnate as to have been described as an erect anatropous ovule. The genus has been well divided chiefly as to the foliage into four sections a Nageia including Nageia of Gaertner as to the fruit and Kaempferi synonym but his having characterised the flower from that (probably) of Nageia nubra, his genus has not been recognised till lately and his name properly discarded for

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the whole genus. b. Eupodocarpus. c. Stachycarpus, including the Chilean Prumnopitys Philippi as well as the Australian and New Zealand typical P. spicata Br. The other species referred to this section in the Prodromus belong to Eupodocarpus, and several of Seeller's specimens compounded by Griesbach with the P. (Stachycarpus) andina, are really those of Lovegothea.
d. Dacrycarpus. Among the ~~two~~ species of this section in the Prodromus, P. Cunninghamii is the common P. cupressoides, and P. tenuifolia appears to be a sterile branch of P. Vieillardii.

5. Araucarioe. Stamens several-often very many-flowered the scales spirally imbricate. Ovuliferous lamina closely adnate to the bract, the two forming apparently a simple scale. Ovules 2, 2 or more, reversed from the centre or base of the ovuliferous lamina. Anther-cells in all the genera pendulous from the apex of the stipes. Six genera, in the first 3, Cunninghamia Agathis and Araucaria the fruiting scale is thin formed chiefly of the bract, the adnate ovuliferous lamina thin, in the 3 others Athrotaxis, Sequoia and Sciadopitys the ovuliferous lamina is thick and fleshy at length hardened and forms the chief part of the fruiting scale. 1. Cunninghamia, a single Japanese and Chinese species has usually 3 ovules on an ovuliferous lamina much shorter than the bract and 2 to 4 anther-cells. The genus is also remarkable for the male flowers collected in ~~a raceme~~ an amentum or head surrounded by an involucre of imbricate bracts. Salisbury's name Belis has the right of priority, but was suppressed by Brown & L. C. Richard on account of its too close resemblance to Bellis. 2. Agathis Ovuliferous lamina much shorter than ~~in Cunninghamia~~ the bract as in Cunninghamia has usually only one (often miletere) ovule, and 3 or more anther-cells. There are several species but some of them but little known. It has been attempted to replace Salisbury's name by that of Dammara ~~Of~~ Rumphius as being older, but Rumphius never established a genus of that name ~~and only~~ but described under ~~it~~ several kinds of gum-yielding trees, of which one is a Canarium, another a Shorea, the third as to one variety at least the Agathis, and Loetaeri Dammara which correspondent is a Burzera. 3. Araucaria, about 10 southern and extratropical or tropical species from the New and the Old World. Ovuliferous lamina scarcely shorter than the whole scale. Ovule 1. Anther-cells 6 to 8. The seed is adnate to the fruiting scale and in the Old-world species forming Salisbury's genus Eutacta, the testa is dilated on each side into a wing which may be equally ascribed to the scale or to the seed. In the 2 American species forming Salisbury's Columbea these wings are wanting. Other distinctive characters are given but appear uncertain. 4. Athrotaxis (often erroneously written Athrotaxis), three Australian species closely so closely resembling the original Sequoia in habit and character, as only to be distinguished by the umbo on the back of the fruiting scale being prolonged into a point. 5. Sequoia, in which I agree to include Wellingtonia although from in the male inflorescence and in the large hard cone it appears to be more distinct from the original Sequoia than is Athrotaxis. 6. Sciadopitys. A single japanese species remarkable for its true leaves reduced to small scales, and replaced by phyllodia resembling the leaves of Pinus.

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& distinct. The most distinct of all the tribes in the great development of the ovuliferous lamina free from or almost free from the bract, the insertion of the ovule, the peculiar appendage of the seed detached from the inner surface of the ovuliferous lamina etc., and if we considered the floral and carpological characters alone, I should have been disposed to adopt Sabatier's view of considering the tribe as a single genus, but that would never now be admitted, and I think we must take foliage and inflorescence alone as supplying the characters of four genera, Picea, Abies, Larix, and Cedrus. Pinus itself only furnishes very secondary characters for dividing it into sections and subsections for even Strobus (including as you say Cembra) and Pinaster almost run into each other, and I trust you will find natural indications of minor divisions which I have not time to look into. Of Abies, the two great divisions Picea Link (Abies Don) and Abies Link. (Picea Don), are well characterised both by the anthers and the cones, but Tsuga has the cones of Picea and foliage of Picea, with the anthers of Abies, Pseudotsuga has also the anthers of Abies and the cones and more developed bracts rather of Abies than of Picea but the persistent scales of the latter, and I think that the four might well be retained as sections of one genus Abies, as done by A. Gray and others. Larix and Cedrus might well be kept up as genera, from their foliage and inflorescence, Larix having the anthers and well developed bract of Abies and Cedrus the anthers and small appressed bracts of Picea and the deciduous cones each of Abies. In Hooker's plate of Larix Griffithii the artist unfortunately figured the anthers of the deodara which had got mixed up with those of the Larix in the herbarium. As to Larix Kaempferi Carr. or Pseudolarix Gord. which we have only in leaf and in fruit, without male or female flowers, I am much puzzled how to place it, but it seems to be nearer Cedrus than Larix notwithstanding its deciduous leaves.

Ill. Hemol. N. F. 25

Any observations on the above will be thankfully received and attended to if they reach me before our Coniferae go to press which at the rate the printer goes on can scarcely be for the next two or perhaps three months

Yours very truly

George Bentham

MISSOURI BOTANICAL GARDEN
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Rec Nov 5th

25, WILTON PLACE.
S.W.

London
Oct 21/79

My dear Sir

I was very glad to see the other day the proofs you sent to Sir Joseph Hooker of the Conifers of the Californian Botany — I was indeed waiting for them to read the Conifers for Seven of the plates I have found no mistake about Juniperus nitida which I had been led by imperfect observation of dried proved to be abortive ovules, but which on revising my MS I found I had marked for reobservation I trust you will not

find it all right

With regard to the genera of
Abietineæ upon consultation with
Dr Joseph we thought it best to
adopt your views as you had studied
them so carefully – we have therefore
kept up the four genera Picea Pinus
Pseudotsuga and Abies I should myself
have preferred at least the reunion
Pseudotsuga with Abies or perhaps
the reunion all four under Pinus,
Abies with four sections – but this
is a matter of taste and convenience
& no real scientific importance and
therefore I do not mind giving way

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The getting up this part of the
Genera has been an affair of much
labour for many two years - I am
now in Monocotyledons and have
begun with Orchideæ as the most
difficult - and if I succeed in getting
through them I may hope to live
to get another part of the work
in type - Hooker does his share
but he has not near the time
necessary for those orders which
require a great deal of reference
and other tedious unremunerative work.

Yours very truly

George Bentham

Dr Engelmann

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